REMARKS

Claims 3, 4, 7, 11-20, 23 and 28-41 are in the application.

The claims have been amended to more particularly point out and distinctly claim applicants' invention. In particular, new claims 28-41 are presented. Independent claims 28 requires that the a second coating having a thickness of from about 2 micrometers to about 25 micrometers, as disclosed at page 8, lines 21-22 of the specification. As noted below, such an outer coating is inherently opaque. Claim 4 has been amended to include the limitation previously stated in claim 5, now cancelled. Claims 6 and 21 have been cancelled without prejudice to the presentation of their respective subject matter in a continuing application. Claim 7 has been amended to include the limitation previously stated in claim 8, now cancelled. These amendments are fully supported by the application as filed, and present no new matter.

A. Rejection of Claims 3-8, 11, 16-21 and 23 Under 35 U.S.C. 103(a)

Claims 3-8, 11, 16-21, and 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 3,528,842 ("Skadulis") in view of U.S. Patent 4,378,408 ("Joedicke"). This rejection is respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

1. The Examiner's Rejection

The Examiner states that Skadulis discloses a process for producing algae-resistant roofing granules, the process comprising applying to raw mineral granules (claimed inert base particles) (referencing column 3, lines 44-46) two layers of ceramic porous coatings (referencing column 2, lines 41-44; column 3, lines 51-53), wherein layer is formed by applying a coating composition containing kaolin and sodium silicate,

pre-drying the applied layer, and then firing at 800-1000 °F thereby forming a moisture permeable porous pigmented silicate-clay coating (referencing Examples I - III, column 2, lines 37-55, 71-72; column 3, lines 1-3, 16-53). The Examiner further states that water-insoluble algaecidal copper compounds such as Cu_2O (claimed cuprous oxide) in an amount of 2 wt % (referencing column 4, line 39) may be added to the coating composition of the first layer (claimed first intermediate particles) (referencing Example III) or of the second layer (claimed second intermediate particles) (referencing Example I). The Examiner notes that the water-insoluble algaecidal copper compounds become soluble under acidic conditions and are released from the porous, silicate-clay coating in an amount effective to prevent growth of algae on the surfaces (referencing column 2, lines 55-70). The appropriate pigments generally metal oxides such as titanium dioxide may be added to the coating compositions (i.e. to any layer) (referencing Examples I - III) to impart the desired color to the coatings (referencing column 3, lines 29-32).

The Examiner acknowledges that Skadulis fails to teach that first layer further contains a void-forming material that release gaseous material at temperatures above 90°C, and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claim 3).

The Examiner further states that Joedicke teaches that kaolin clay is used extensively in silicate paint formulations for coloring roofing granules as a filler, extender, moisture release agent and reactant to aid film insolubilization during high temperature firing (See column 1, lines 17-22). The Examiner notes that impurities in kaolin clay cause grey coloration, such that white colored roofing granule insolubilized alkali silicate coatings using natural kaolin clay frequently require appreciable amounts of expensive titanium dioxide to achieve desired white or light color (referencing column 1, lines 33-

42). The Examiner also notes that the pigment requirements in silicate-clay coating formulations, particularly expensive titanium dioxide in white coatings, can be reduced by increasing the opacity, or hiding power, of the coating itself (referencing column 2, lines 17-26) by adding inexpensive gas-forming compounds such as hydrogen peroxide, sodium perborate ($NaBO_3$) to the silicate-clay coating (referencing column 2, lines 40-52). The Examiner states that inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary lightening of the fired coating, which is due to decomposition of the dissolved gas forming compounds to fore light scattering microvoids (i.e. gas-forming particles should have claimed particle size of less than 2 mm to produce microvoids) that greatly enhance the whiteness and opacity of the silicate coating (referencing column 4, lines 18-26), and afford significant pigment reductions, particularly titanium dioxide in whites (referencing column 3, lines 1-3). The Examiner states that the granules may be coated in one or more coats with any desired amount of coating material and gas forming compound may be used in any one or more of the coatings (referencing column 5, lines 38-41). The Examiner concludes her characterization of Joedicke's teaching by stating that Joedicke teaches that roofing granules may be coated in multiple coats with any desired amount of coating material and gas-forming compound may be used in any one of multiple coatings to greatly enhance film opacity and afford significant pigment reductions, particularly titanium dioxide in whites.

The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have added inexpensive gas-forming compounds such as hydrogen peroxide, sodium perborate ($NaBO_3$) to an algaecidal coating composition for making a first coating layer on roof granules in Skadulis with the

expectation of providing algaecidal roof granules with the desired enhanced film opacity and significant pigment reductions, because Joedicke teaches that roofing granules may be coated in one or more coats with gas forming compound being used in any one of multiple coatings to greatly enhance film opacity and afford significant pigment reductions, particularly titanium dioxide in whites.

The Examiner further states that as to pore size, thickness and concentration limitations, it is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation, citing In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), and In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

The Examiner further concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant pore size, thickness and concentration parameters (including those of claimed invention) in Skadulis in view of Joedicke through routine experimentation in the absence of showing of criticality.

2. The Examiner's Response to Applicants' Arguments

In response to applicants' arguments filed January 30, 2007, the Examiner stated that she had fully considered those remarks but that they had not persuaded her.

In particular, with respect to applicants' first argument, the Examiner stated that applicants argue that Joedicke does not disclose or suggest that the use of gas-forming compound in an interior coat will result in either greatly enhanced film opacity or significant pigment reductions. The Examiner recognized that the applicants had maintained that a person coating roofing granules would understand Joedicke '408's teaching filtered through that person's ordinary skill in the art and common sense. The

Examiner further noted that the applicants had argued that one of ordinary skill in the art would understand that creating microvoids in an interior layer might or might not contribute to enhanced film opacity and might or might not permit a reduction in expensive hiding pigments, in particular, titanium dioxide, depending on the composition of layers on the outside of the microvoid-containing interior layer. The Examiner acknowledged that the applicants had argued that the inclusion of gas forming compounds into silicate coatings of Skadulis would be more effective if it is included into the outer layer the pigmented outer layer or layers would necessarily mask or hide the inner layer, so that light scattering is diminished or extinguished entirely.

However, the Examiner respectfully disagreed with applicants' argument. The Examiner maintained that the outer layer of Skadulis carrying no algaecide may be formed as a very thin layer so that it would not cover the color of the first layer. In this case the inclusion of gas forming compounds into first algaecide containing layer of Skadulis would be more effective than if it were included into the outer layer.

In response to applicants' second argument, the Examiner stated that applicants argue that one of ordinary skill in the art would not be provided any suggestion or incentive by Joedicke '408 to add gas-forming material to an interior coating layer for a roofing granule where the exterior layer itself contained a significant amount of light-scattering pigment, such as titanium dioxide.

The Examiner stated that this argument is unconvincing because primary reference, Skadulis, teaches that the appropriate pigments generally metal oxides such as titanium dioxide may be added to any layer (referencing Examples I-III; and column 3, lines 29-32), and stated that they may be added, for example, only to the first layer

(referencing Example I) to impart the desired color to the coatings (referencing column 3, lines 29-32).

In response to applicants' third argument, the Examiner stated that applicants argue that one of ordinary skill in the art would find Joedicke '408 largely irrelevant to the preparation of dark-colored roofing granules. The Examiner recognized that applicants had argued that whereas light- or white-colored roofing granule coatings include materials such as titanium dioxide that reflect light, dark colored roofing granule coatings include material that absorb rather than reflect light, hence the dark color.

The argument found this argument unconvincing because Skadulis teaches roofing granule coatings having (any) desired color by addition of metal oxide pigments including titanium dioxide (e.g. light grey color). The Examiner concluded that, in contrast to applicants' argument, one of ordinary skill in the art would find Joedicke '408 largely relevant to the preparation of light colored roofing granule coatings of Skadulis.

3. <u>The Examiner's Response to the Declaration of Dr. Keith Hong</u>

The Examiner also stated that she had considered the Declaration of Dr. Keith Hong filed on January 15, 2007 but did not consider it to be persuasive.

In particular, the Examiner noted that Dr. Hong states that since applicants' algaecide containing coating and commercial algae-resistant granules are typically gray in color, reflecting the use of carbon black in the coating compositions (shown in Exhibits A and B), one of ordinary skill in the art would not be motivated to add a void-forming material such as hydrogen peroxide or sodium perborate to the inner coating composition material in the process of the present invention, simply because increasing the "opacity" of the coating composition would require additional pigment, rather than

less as in the case of white or light-colored materials, and would not improve the appearance of the granules (See paragraphs 4-6).

The Examiner respectfully disagreed with this argument, noting that first of all, addition of appreciable amounts of titanium dioxide to the coating composition of Skadulis would lighten, the dark grey coloration of the coating after firing (i.e. the fired coating would be light grey). The Examiner also observed that secondly, Joedicke `408 teaches that inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary lightening of the fired coating, which is due to formation of light scattering microvoids that greatly enhance the whiteness and opacity of the silicate coating (See column 4, lines 18-26), and afford significant pigment reductions, particularly titanium dioxide added to grey colored coatings (See column 3, lines 1-3). The Examiner further observed that it seemed that there is no difference in color between titanium dioxide-containing coating of Skadulis that would be of light color even after firing, and light grey colored silicate coatings of Joedicke `408. The Examiner further concluded that one of ordinary skill in the art would reasonably expect that inclusion of gas forming compounds in the titanium dioxide-containing coating of Skadulis, which would be of light grey color even after firing, would work the same way as with light grey-colored silicate coatings of Joedicke `408, that is, the inclusion of gas forming compounds would extraordinary lighten the color of the titanium dioxide-containing coating of Skadulis after firing due to formation of light scattering microvoids. The Examiner further concluded that one of ordinary skill in the art would have reasonable expectation of success in achieving the same degree of lightness of titanium dioxide-containing coating of Skadulis but with less amount of titanium dioxide by inclusion of gas forming compounds into titanium dioxide-containing coating of Skadulis

because Joedicke `408 teaches that inclusion of gas forming compounds in silicate coatings for roofing granules results in extraordinary lightening of the fired coating.

With respect to Dr. Hong's statement that inclusion of gas forming compounds into silicate coatings of Skadulis would be more effective if it is included into the outer layer, the Examiner respectfully disagrees with this argument. The Examiner stated that the outer layer of Skadulis carrying no algaecide may be formed as a very thin layer so that it would not cover the color of the first layer. The Examiner stated that in this case the inclusion of gas forming compound into first algaecide containing layer of Skadulis would be more effective than if it were included into the outer layer.

With respect to Dr. Hong's statement that inclusion of gas forming compounds into silicate coatings of Skadulis may not work because of dark colored coatings absorb light rather than reflect light, the Examiner respectfully disagreed with this argument. The Examiner stated that Skadulis does not limit his teaching of the addition of metal pigments to a particular layer, i.e. a pigment may be added to any layer, including the first layer, to achieve the desired color. The Examiner stated that obviously, one of ordinary skill in the art would add appreciable amount of titanium dioxide if light color of the final coating (i.e. after firing) were desired.

B. Applicants' Response to the Examiner's Rejection

Applicants respectfully disagree with and vigorously traverse the Examiner's rejection.

The Examiner stated that the outer layer of Skadulis carrying no algaecide may be formed as a very thin layer so that it would not cover the color of the first layer. This is improper technical speculation on the part of the Examiner. There is nothing in the reference cited which supports the Examiner's speculation. The Examiner's speculation

is contrary to the common sense expectation of one of ordinary skill in the art, and is not consistent with the evidence of record, Dr. Hong's declaration.

Skadulis does not even discuss forming multiple coating layers, but merely includes three working examples in which two layers were formed. In Example I a first coating composition including rutile titanium dioxide is applied to the base granule and fired to 950 degrees F. After cooling a second coating composition is "applied to the colored pre-coated granules in the mixer, following which the granules were fired to 700 ° F. to insolubilize the silicate coating." (col. 4, lines 43 - 46). The second coating composition includes both rutile titanium dioxide and cuprous oxide, so that "[t]he resulting granules had a very slightly reddish off-white color." (col. 4, lines 47-48) In Example II cuprous bromide was substituted for the cuprous oxide of Example I, but there is no disclosure regarding the color of the granules. In Example II, titanium dioxide was omitted from the first coating composition, and cobalt blue stain was added to the second coating composition, so that "[t]he resulting granules were bluish-gray in color . . . ." (col. 5, line 32).

There is nothing in Skadulis to suggest it would even be possible to form a transparent outer layer as the Examiner speculates.

In each of the three examples, Skadulis discloses adding titanium dioxide to the outer layer to color the layer. There is nothing in Skadulis to suggest that the titanium dioxide should or could be omitted. In addition, in both layers and in each example, the coating binder is sodium silicate with kaolin clay dispersed therein.

Because Skadulis requires a coating sufficiently porous to permit leaching of metal ions from the granule coating, Skadulis employs as a binder sodium silicate and clay which is filed to a temperature above the dehydration point of the sodium silicate but

below the melting point of the clay (col. 3, lines 16 - 32). A discussion of physical changes that occur during the drying and firing of clay is provided in Chapter 4 of D. Rhodes, Clay and Glazes for the Potter (Chilton Book Company, Radnor, PA, 1973), a copy of which is provided herewith. Skadulis expressly rejects using prior art methods, such as disclosed in U.S. Patent 1,782,649, which provide impermeable glazes (col. 3, lines 54-60). Because Skadulis fires his coatings to temperatures below the melting point of the clay, one of ordinary skill in the art would expect that the clay in the insoluble coatings to be in the form of a light-scattering, crystalline particulate. Contrary to the Examiner's speculation, one of ordinary skill in the art would have no reason to expect that such a coating would become transparent no matter how thinly it is applied. Further, there is nothing in Skadulis which would suggest to one of ordinary skill in the art that the coating composition should be thinly applied. On the contrary, in his examples, Skadulis applies a coating at least thickly enough to result in "colored granules" in every case.

Even if the Examiner's speculation were technically accurate and legally proper, it would not be applicable to applicants' new claims (28-41) which require that the second coating have a thickness of from about 2 micrometers to 25 micrometers (independent claim 28).

With respect applicants' argument that one of ordinary skill in the art would not be provided any suggestion or incentive by Joedicke '408 to add gas-forming material to an interior coating layer for a roofing granule where the exterior layer itself contained a significant amount of light-scattering pigment, such as titanium dioxide, the Examiner incorrectly characterized Skadulis as teaching that the appropriate pigments generally metal oxides such as titanium dioxide may be added to any layer (referencing Examples

I-III; and column 3, lines 29-32), and also incorrectly stated that they may be added, for example, only to the first layer (referencing Example I) to impart the desired color to the coatings (referencing column 3, lines 29-32).

Skadulis discloses the use of titanium oxide in the inner layer of two of his three examples (I and II), but omits titanium oxide completely from his third example. Nowhere does he say that appropriate pigments may be added to any layer. There is no example of adding titanium oxide only to the first layer, contrary to the Examiner's statement. In Examples I and II titanium dioxide is added to both layers. The "take home" lesson for one of ordinary skill in the art from Skadulis' set of example is that it is not necessary to add any coloring pigment to the inner layer - the third example omits titanium dioxide from the inner layer and yet provides a suitable colored resulting granule. So, why add expensive pigment to the inner layer where it will not be visible? The Examiner's contrary understanding of the significance is not correct.

Regarding applicants' argument that one of ordinary skill in the art would find Joedicke '408 largely irrelevant to the preparation of dark-colored roofing granules, because whereas light- or white-colored roofing granule coatings include materials such as titanium dioxide that reflect light, dark colored roofing granule coatings include material that absorb rather than reflect light, and thus have a dark color, the Examiner misconstrues the significance of the cited references. The Examiner found this argument unconvincing because Skadulis teaches roofing granule coatings having (any) desired color by addition of metal oxide pigments including titanium dioxide (e.g. light grey color), and that consequently one of ordinary skill in the art would find Joedicke '408 largely relevant to the preparation of light colored roofing granule coatings of Skadulis. Even if this were correct, it is not relevant to applicants' dark colored granules (claims 3,

4, 7, 11-20, and 23) containing copper. The properly framed issue is not whether Joedicke is relevant to Skadulis, but whether Skadulis and Joedicke are relevant to the presently claimed in invention.

The Examiner's response to Dr. Hong's point that the combination of Skadulis and Joedicke would not be relevant to the production of dark-colored granules is similarly off the point. The Examiner simply ignores whether the claimed invention would be obvious to one of ordinary skill in the art and focuses instead on a straw man of her own construction - whether the cited art would be relevant to a hypothetical light-colored granule. This is not proper.

The combination of Skadulis and Joedicke fails to make out a *prima facie* case of obviousness. The rejection over Skadulis in view of Joedicke should be withdrawn for these reasons. Reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

C. Rejection of Claims 3-8, 11, 16-21 and 23 Under 35 U.S.C. 103(a)

Claims 3-8, 11, 16-21, 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 3,528,842 ("Skadulis") in view of U.S. Patent 3,918,407 ("Greenberg"). This rejection is also respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

1. The Examiner's Rejection

The Examiner states that Skadulis is applied here for the same reasons as in the case of the first rejection entered. The Examiner acknowledges that Skadulis fails to teach that first layer further contains a void-forming material that release gaseous

material at temperatures above 90°C; and have an average particle size no larger than 2 mm, which form pores upon firing, and the second layer does not have a void-forming material (Claim 3). The Examiner states that Greenberg teaches that release rate of toxicant (referencing column 1, lines 9-12) can be controlled by controlling texture and porosity of a solid heat-cured carrier by incorporating into the carrier before heat-curing a predetermined amount of heat decomposable gas forming particles (referencing column 3, lines 55-64; column 7, lines 66-67). The Examiner further states that the internal porosity, texture and surface porosity of the carrier must be sufficiently coordinated to allow a sufficient release of the toxicant from the carrier (referencing column 3, lines 58-61). The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated particles of heat decomposable gas forming compound to a coating composition of a first layer in Skadulis with the expectation of providing the desired release rate by controlling texture and porosity of the layer with the use of particles of gas forming heat decomposable compound, as taught by Greenberg. The Examiner states that obviously, the pore size would depend on particle size of heat decomposable gas forming compound. The Examiner further states that as to particle size of heat decomposable gas forming compound, pore size, thickness and concentration limitations, it is held that it is not inventive to discover the optimum or workable ranges of result-effective variables by routine experimentation, citing In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), and In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The Examiner further concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have determined the optimum values of the relevant particle size, pore size, thickness and concentration parameters (including those of claimed

invention) in the cited prior art through routine experimentation in the absence of showing of criticality.

2. Response to the Examiner's Rejection

The Examiner's rejection is improper because (1) Greenberg is nonanalogous art, and (2) the rejection is simply an unsuccessful attempt at reconstruction of applicants' invention guided by hindsight.

Greenberg discloses an invention that "relates to the control of fleas on warm blooded animals, such as dogs and cats, by application of an insecticidal gas generation device." (col. 1, lines 3-6) Greenberg is presently classified in U.S. class 119, "animal husbandry." The present application has been classified in U.S. class 52, "static structures (e.g., buildings)." These arts are wholly unrelated.

A prerequisite to determining obviousness under 35 U.S.C. 103 is the determination of what is the scope and content of the prior art. Graham v. John Deere Co., 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966). This determination is made by ascertaining whether the prior art is "analogous." In re Clay, 23 U.S.P.Q.2d 1058, 1060 (Fed. Cir. 1992), citing In re Sovish, 226 U.S.P.Q. 771, 773 (Fed. Cir. 1985).
The art of Greenberg can in no manner be considered analogous art to that of the invention at hand. To be analogous art, a two-part test must be satisfied. In re Clay, 23 U.S.P.Q.2d 1058, 1060 (Fed. Cir. 1992), citing In re Deminski, 230 U.S.P.Q. 313, 315 (Fed. Cir. 1986), and In re Wood, 202 U.S.P.Q. 171, 174 (CCPA 1979). Here, this test fails dramatically.

The first prong of the test asks "whether the art is from the same field of endeavor, regardless of the problem addressed." Greenberg discloses a flea collar for pets. The present invention relates to roofing granules and roofing materials.

Greenberg merely discloses an arbitrary invention, from a widely different field of endeavor that has no possible relationship to roofing granules. Greenberg fails the first prong by any conceivable analysis.

The second prong of the test asks: "if the reference is not within the field of the inventor's endeavor, [is] the reference ... still reasonably pertinent to the particular problem with which the inventor is involved[?]" The particular problem of the invention at hand involves algae growth on roofs by release of sparingly soluble metal ions. Greenberg does not attempt to resolve any such problem, but rather the problem of continuous release of a volatile gaseous insecticide having a low vapor pressure from plastic flea collars. Because Greenberg substituted "naled," that is, dimethyl-1,2-dibromo-2,2,dichloroethyl phosphate for the DDVP, dimethyl 2,2-dichlorodivinyl phosphate, more conventionally used, and because naled has a lower vapor pressure than DDVP, the rate of release of naled from polyvinylchloride collars was less than the optimum dosage to protect the pet wearing the collar from fleas. Greenberg simply increased the surface area of the collar by adding a "porosity control agent" to make the flea collar surface porous. The present invention addresses an entirely different problem. The initial rate of release of algaecidal metal ions is not the problem - but rather obtaining a more effective and efficient use of the algaecide so that release can be tailored to specific anticipated environmental situations. Greenberg is simply not at all pertinent to this problem.

Thus, since both prongs of the analogous art test unquestionably fail, Greenberg is inapplicable as analogous art.

Even if Greenberg were part of the content of the relevant prior art, the Examiner's suggested combination with the Skadulis would not render the presently

claims obvious. Greenberg solves his (unrelated) problem by increasing the surface porosity of the flea collars (col. 5, lines 17-28): "The main function of the additive is to provide a surface porosity which preferably includes pores extending part way down into the body of the collar." This is achieved by employing an additive which has a boiling point at or below the curing temperature of the polyvinylchloride resin. Adding some low boiling additive to increase the surface porosity of roofing granules would not provide the presently claimed invention - the porosity of the outer layer that forms the surface would be increased - not that of the inner layer. Thus, the combination of Skadulis and Greenberg does not even meet the limitations of applicants' presently claimed invention, but rather teaches one of ordinary skill in the art away from that invention. The combination of Skadulis and Greenberg fails to establish a *prima facie* case of obviousness. Reconsideration and withdrawal of the rejection entered under 35 USC 103(a) over Skadulis in view of Greenberg are respectfully requested for these reasons as applicable to the amended claims.

D. <u>Rejection of Claims 12 and 13 Under 35 U.S.C. 103(a)</u>

Claims 12 and 13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke, or Skadulis in view of Greenberg, and further in view U.S. 3,507,676 ("McMahon"). This rejection is respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

The Examiner states that the cited prior art is applied here for the same reasons as in the case of the prior two rejections. The Examiner acknowledgeds that cited prior art fails to teach that a combination of cuprous and zinc oxide (ZnO) is used as an

algicidal agent (Claim 12). The Examiner further states that McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules (referencing column 1, lines 14-15). The Examiner notes that it is well settled that it is *prima facie* obvious to combine two compositions each of which is taught by the prior art to be useful for the same purpose, in order to form a third composition which is to be used for the very same purpose. The Examiner concludes tha it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a combination of cuprous and zinc oxide as an algicidal agent in the cited prior art since McMahon teaches that ZnO is suitable for the use as algicide in coating of roofing granules.

Applicants respectfully contend that the cited combination of references does not make out a *prima facie* case of obviousness with respect to the presently claimed invention. Even were the references combined as suggested by the Examiner, there would be nothing to teach or suggest to one of ordinary skill in the art to include void-forming material in the inner coating layer but not in the outer coating layer of dark colored roofing granules containing cuprous oxide, or to the inner coating layer of roofing granules have an opaque outer layer. McMahon does not add anything to the combination of Skadulis in view of Joedicke in this regard, or to Skadulis in view of Greenberg. Accordingly, reconsideration and withdrawal of the rejection of claims 12 and 13 entered over Skadulis in view of Joedicke, or Skadulis in view of Greenberg, and further in view of McMahon, as applicable to the amended claims, are respectfully requested for this reason.

E. Rejection of Claims 14 and 15 under 35 U.S.C. 103(a)

Claims 14-15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Skadulis in view of Joedicke or Skadulis in view of Greenberg, and further in view of U.S. Patent 4,430,108 ("Hojaji"). This rejection is also respectfully traversed, and reconsideration and withdrawal of the rejection are respectfully requested as applicable to the amended claims.

The Examiner states that the cited prior art are applied here for the same reasons as in the first two rejections entered. The Examiner acknowledges, however, that the cited prior art fails to teach that sugar is used as gas-forming material. The Examiner states that Hojaji teaches that sugar is suitable for the use as gas-forming material (referencing column 8, lines 47-57) in glass compositions for roof shingles (referencing column 4, lines 19-20). The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a sugar as gas-forming material in the cited prior art since Hojaji teaches that sugar is suitable for the use as gas-forming material in glass compositions for roof shingles.

In support of their traverse of this rejection applicants respectfully contend that Hojaji does not supply the teaching or suggestion missing from the combination of Skadulis and Joedicke, or of Skadulis and Greenberg, that void-forming material be included in the inner layer composition but excluded from the outer layer composition in either a dark-colored composition including cuprous oxide or a roofing granule with an opaque outer layer. Consequently, the cited combination of prior art references does not make a *prima facie* case of obviousness of the claims as presently amended.

Reconsideration and withdrawal of the rejection of claims 14 and 15 over Skadulis in view of Joedicke, or Skadulis in view of Greenberg, and further in view of Hojaji are respectfully requested for these reasons.

Applicants respectfully solicit reconsideration, withdrawal of the rejections entered, and an early notice of allowance.